

 <p>Pollution Prevention Case Study</p>	<p align="center">John Deere Horicon Manufacturing Operations</p> <p align="center">Envirocrate® - Reusable Shipping Containers</p>
Standard Industrial Classification (SIC)	General manufacturing - lawn and garden tractors /3524
Type of Waste	Wood and metal crating
Strategy	Material substitution
Company Background	John Deere Horicon Manufacturing Operations has been located in the Horicon area for over 75 years and is the world's largest lawn and garden tractor manufacturer. The factory employs close to 1,500 people and covers an area of more than one million square feet.
Original Process	Riding mowers, lawn tractors and commercial lawn care equipment are manufactured at the Horicon facility. These products were previously shipped from the plant in disposable containers made of wood and metal crating. Many John Deere dealers found it increasingly difficult to dispose of this material.
Motivation	John Deere sought to reduce on-going material, manufacturing, and disposal costs associated with the original packaging. They also sought to reduce dealer shop labor for uncrating and setup of the product, and to promote environmental benefits resulting from waste reduction. John Deere was especially concerned with reducing the amount of product packaging to be landfilled.
Pollution Prevention Process	John Deere developed a reusable shipping container, called the Envirocrate®, made of a welded steel design, with E-coat and powder paint coverage. Each Envirocrate® is expected to be reused 13 times during a ten-year life. The containers can be folded after use to a height of six inches and stacked 16 high until they are shipped back to the factory for reuse.
Stage of Development	The current project covers the first phase of a two-phase program that will eliminate disposable (wood and metal) crating on all of John Deere's North American small and mid-size ride-on lawn and grounds care equipment.
Level of Commercialization	The Envirocrate® was designed by Horicon Manufacturing Operations employees. The design is covered under a patent issued in 1989 for a returnable shipping stand for lawn and garden tractors. Manufacture of the Envirocrates® is done in-house and began in June 1994.
Material/Energy Balance	<p>Original Process</p> <p>Feedstock Wood and metal used in making disposable crates.</p> <p>Waste</p>

	<p>Wood and metal crating</p> <p>Disposal Landfilled or sent to a recycler (depending upon the receiving state's laws)</p> <p>Pollution Prevention Process</p> <p>Feedstock None</p> <p>Waste None</p> <p>Disposal None. Envirocrates® will eliminate 2,300 tons of wood and 2,200 tons of steel crating annually.</p>
Economics	<p>Capital Costs Capital costs were \$9.5 million for this project.</p> <p>Operation/Maintenance Costs Retailers pay a \$10 user fee each time the containers are used. The factory pays for return freight, maintenance and repair. The annual disposable crating cost avoidance will be \$3.5 million; the annual dealer fee will be \$1 million; and the annual return, storage, and maintenance costs will be \$2.0 million.</p> <p>Payback Period The payback period for this project is calculated to be 4.5 years.</p>
Benefits	The use of Envirocrates® has reduced disposal costs and dealer shop labor, and has resulted in substantial waste reduction.
Obstacles	Exported products will continue to be shipped in disposable crating for at least the short-term due to prohibitive return freight costs.
Technology Transfer	Although the Envirocrate® is covered by a patent issued in 1989, other companies can develop reusable shipping containers for their own uses.
Other Pollution Prevention Activities	The replacement of wet spray painting with a combination of powder painting and the purchase of parts with the color already molded into them to decrease volatile organic compounds is currently being investigated.
Company Address	John Deere Horicon Manufacturing Operations 203 East Lake Street Horicon, Wisconsin 53032
Contact Person	Ellen DeMers 414/485-5750
Pollution Prevention Resources	Free, On-site Technical Assistance University of Wisconsin Extension Solid and Hazardous Waste Education Center

Milwaukee area: 414/475-2845
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Pollution Prevention Information Clearinghouse

Wisconsin Department of Natural Resources
Cooperative Environmental Assistance
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**Bureau of Cooperative Environmental Assistance
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